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published RTOG study 0933). Assessment of health status and neurocognitive function after hyperfractionated radiotherapy of CSA in the SIOP PNET IV trial showed in part a better outcome as compared with conventional fractionation, especially in younger children.
Conclusions: The impact of radiotherapy on the risk for late effects and its clinical pattern apparently strongly depends on the exposure of functionally relevant regions within the brain to irradiation. Neuroregeneration and the preservation of the corresponding anatomical regions may play an important role in the reduction of radiation induced decline of cognitive function. The impact of fractionation on the risk to develop a decline in neurocognitive function is controversial and requires further research.

SP-0339
Long-term results of brachytherapy in gynaecological pelvic tumours
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Purpose: Reported experiences focusing on vulvo-vaginal brachytherapy during childhood are rare and most reported children have been treated at Gustave Roussy in France. Our technique of gynaecological brachytherapy has always been anatomy-adapted with use of the mould applicator. Here, we assessed the long-term toxicities of conservative treatments integrating brachytherapy in female survivors with localized vulvo-vaginal tumors.
Patients and Methods: The data from 42 patients treated at Gustave Roussy between 1971 and 2004, were both retrospectively and prospectively analyzed. Strictly confidential surveys buildup based on the LENT SOMA questionnaires were mailed and 51% were filled up (minor: 29%; adult: 71%). Complications were recorded throughout follow-up and graded according to the CTCAE version 4.0.
Results: The median age at diagnosis was 1.7 years (range, 0.6-16.6) and most patients (69%) had rhabdomyosarcomas. Treatments included brachytherapy for all patients, chemotherapy (88%), surgery (31%), and external-beam radiotherapy (5%). At a median follow-up of 15.5 years, 41/42 patients were alive. There was 160 late effects identified in 32/42 (76%) patients: 72% G1-G2, and 28% G3-4 (mean all grade late effect per patients: 4±4 [median: 2.5; range, 0-16] and mean G3-4 late effect per patients: 1±1.9 [median: 0; range, 0-8]). The most commons late toxicities were gynecologic for all grade (75/160; 47%) and urinary for G3-4 (24/45; 53%). Fourteen patients (33%) required surgical treatment of late complications. The 15-year actuarial incidence rate of G3-4 late effects was 51%. The total number of all grade and G3-4 late effects was significantly increased in patients treated before 1990 (p=0.005 and p=0.008) and with higher cumulated dose (p=0.03 and p=0.02) and maximal dose delivered to ovaries (p=0.002 and p=0.04), and larger brachytherapy volume (p=0.03 and p=0.02). Quality of life was good or very good in 91% of patients that answered the surveys.
Conclusion: The burden of late effects decreased with advances in treatment. A highly specialized multidisciplinary approach combining stringently controlled brachytherapy parameters, elective surgical indications, and efficient chemotherapy regimens should allow pursue improvements in terms of long-term sequelae.

SP-0340
External irradiation-related late toxicities in extracranial childhood tumours
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Side effects after external radiotherapy in pediatric oncology are multifaceted and depend on the age of the patient at time of treatment, location, size of the target volume, and the OAR inside or in the neighborhood of the target. Not only high doses do have an effect on the growing structures but as well low doses can provoke severe long term side effects. Most of the side effects are not visible during the first 5 years after treatment but develop continuously over decades, and can influence quality of lifelong. Based on the experience in pediatric radiooncology and dose distribution at the growing structures, most of these side effects are predictable and some of them are avoidable using adequate techniques. According to the age of the patient different long term side effects are to be aspected. For example children in the of > than 9 years after mantel field irradiation have a much higher risk to develop breast carcinoma than younger children, meanwhile the growing deficit of the bones are much pronounced after RT in younger children than in older ones. Due to the combined treatment schedules most of the side effects are combined and the real dimension of RT-dose and irradiated volume cannot always be evaluated. Based on different patient cases the development of long term side effects will be discussed.

OC-0341
Radiation-associated cerebrovascular accidents in =5-year childhood cancer survivors
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Purpose/Objective: Improved childhood cancer survival is accompanied by an increased incidence of tumor- and treatment-related adverse events later in life. Cerebrovascular accidents (CVAs) including ischemic and hemorrhagic stroke are amongst the most serious events. The purpose of this study was to determine the incidence and severity of symptomatic CVAs occurring 5 years or later after the primary cancer diagnosis in a cohort of long-term childhood cancer survivors, and to assess dose-effect relationships for cranial radiotherapy (CRT) and supradiaphragmatic radiotherapy (SDRT).
Materials and Methods: The single-center study cohort consisted of 1362 ≥5-year survivors diagnosed between 1966 and 1996; two survivors who had a CVA within 5 years after diagnosis were excluded from the cohort. CVAs were clinically confirmed, and defined and graded for severity using the Common Terminology Criteria for Adverse Events (CTCAEv.3.0). Physical radiation doses were available for 411 (93.8%) of the 438 survivors treated with CRT and/or SDRT, and converted into the equivalent dose in 2-Gy fractions (EQD_2). Cox proportional hazard models were used to estimate the hazard ratio (HR) and 95% confidence interval (95%CI) for sex, age at diagnosis, brain surgery, chemotherapy, CRT and SDRT. In a second model, the